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SOURCE Organizatsiya Vagonnovo Khozyaystva (Organization of Railroad Car Management) by N. Z. Krivoruchko, Transzheldorizdat, Moscow, 1950,

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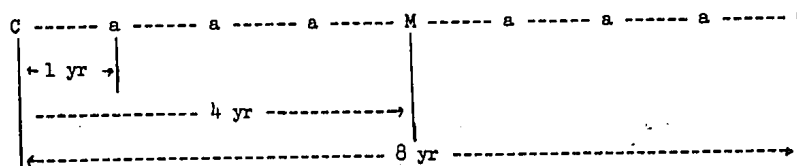
LABOR AND BETWEEN-REPAIR NORMS
FOR CAR REPAIRS IN THE USSR

The repair schedules for Soviet railroad cars are aimed at forestalling wear and preventing breakdowns. To accomplish this, between-repair time norms based on the type of car have been established.

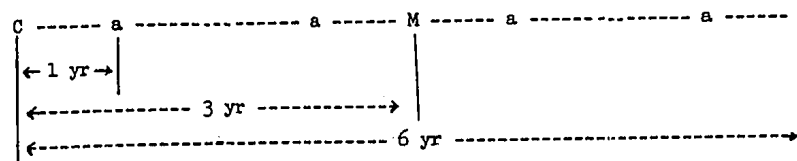
In the case of capital repairs, this time norm is 8 years for Soviet-built cars having center sills, and 6 years for the old-type cars without center sills. The period between capital repairs on passenger cars is 9 years for hard-seat passenger cars and 6 years for soft-seat passenger cars. For service cars and club cars, the period is 8 years.

The following charts show the periods between capital, medium or moderate, and annual repairs. In the table, the letter "C" stands for capital repairs, "M" for medium or moderate, and "a" for annual repairs.

Freight Cars With Center Sills



Freight Cars Without Center Sills (Old Type)



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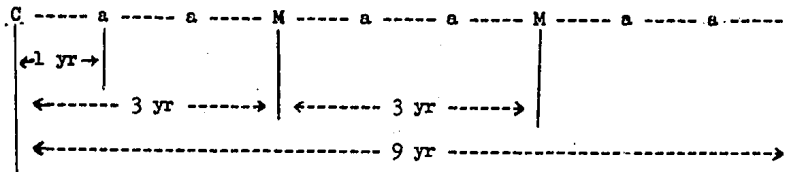
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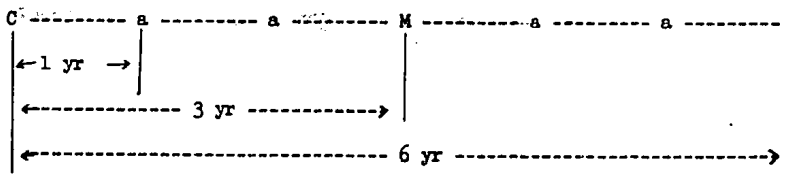
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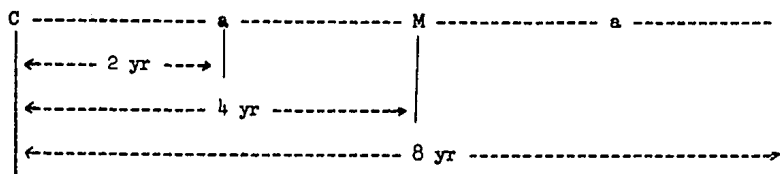
Hard-Seat Passenger Cars



Soft-Seat Passenger Cars



Other Type Cars (Service, Club, etc.)



In addition to the above repairs, provision is also made for periodic inspections. The brakes are given an annual inspection, ordinarily carried out at the same time as the annual repairs. The automatic brakes and the journals are both re-examined; the automatic brakes 6 months after the planned repairs are carried out, the freight car journals every 6 months, and the passenger car journals every 3 months.

The following table gives the approximate number of man-hours consumed per car for both four-axle and two-axle cars undergoing capital, medium, annual, and current or running repairs, the latter with the car uncoupled. [The table is reproduced as it appeared in the source with apparent errors.]

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Man-Hours Consumed per Car

<u>Type of Repairs</u>	<u>Four-Axle Cars</u>			<u>Two-Axle Cars</u>		
	<u>Erection Shop</u>	<u>Auxiliary Shops</u>	<u>Total</u>	<u>Erection Shop</u>	<u>Auxiliary Shops</u>	<u>Total</u>
<u>Freight Cars</u>						
Capital	202	128	320	94	56	140
Medium	90	60	150	60	40	100
Annual	52	28	70	42	22	64
Current, car uncoupled	11.8	7.2	18	7	5	12
<u>Passenger Cars</u>						
Capital repairs	900	600	1,500	660	440	1,100
Medium	540	360	900	360	240	600
Annual	90	60	150	66	44	110
Current, car uncoupled	19	13	32	14	10	24

The following table gives approximate layover norms for cars undergoing the various types of repairs. Workdays are made up of one shift.

<u>Type of Repairs</u>	<u>Four-Axle Cars</u>	<u>Two-Axle Cars</u>
<u>Freight Cars</u>		
Capital	4 da	3 da
Medium	2-3 da	2 da
Annual	8 hr	8 hr
Current, car uncoupled	3.5 hr	3.5 hr
<u>Passenger Cars</u>		
Capital	14-16 da	10 da
Medium	12 da	8 da
Annual	3-4 da	2 da
Current, car uncoupled	8 hr	8 hr

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The following table, based on the total number of man-hours consumed per car for repairs, gives the approximate percentages of this total required for carrying out various repairs on freight and passenger cars.

	<u>Capital Repairs</u>		<u>Medium Repairs</u>		<u>Annual Repairs</u>		<u>Current Repairs Regardless of Axles</u>
	<u>Four-Axle</u>	<u>Two-Axle</u>	<u>Four-Axle</u>	<u>Two-Axle</u>	<u>Four-Axle</u>	<u>Two-Axle</u>	
<u>Freight Cars</u>							
Running parts, draft gear, automatic coupling	13.5	18.0	15.5	18.0	12.0	16.0	42.0
Fitters repairing body and frame	4.0	3.0	6.0	4.0	8.0	3.0	
Brake repairmen	7.5	8.0	7.0	8.0	8.0	7.0	
Truck repairmen	7.5	--	11.0	--	16.0	--	
Carpenters repairing body and inside equipment	20.0	22.0	13.5	18.0	12.0	22.0	20.0
Riveters	6.0	2.0	5.5	2.0	4.0	2.0	--
Roof fitters	5.5	7.0	5.5	6.0	6.0	8.0	7.0
Welders	4.5	3.0	4.0	3.0	4.0	3.0	3.0
Painters	7.5	8.0	5.5	8.5	6.0	9.0	8.0
Blacksmiths, forgers	1.5	1.0	1.0	1.0	1.0	1.0	11.0
Machine operators	4.0	5.0	4.0	4.0	4.0	5.0	
Bearing reliners	1.0	1.0	1.0	1.0	1.0	1.0	
Spring riggers	2.5	2.5	3.0	4.0	3.0	4.0	
Wheelwrights	7.5	6.5	19.0	10.0	7.0	6.0	9.0
Other workers	7.5	13.0	7.5	13.5	6.0	13.0	
<u>Passenger Cars</u>							
Running parts, draft gear, automatic coupling	4.0	4.0	3.0	4.5	12.0	10.0	38.0
Fitters repairing body and frame	2.0	2.0	1.5	1.0	8.0	8.0	
Brake repairmen	2.0	3.0	3.0	3.5	10.0	10.0	
Truck repairmen	5.0	--	5.0	--	4.0	--	

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	<u>Capital Repairs</u>		<u>Medium Repairs</u>		<u>Annual Repairs</u>		<u>Current Repairs Regardless of Axles</u>
	<u>Four-Axle</u>	<u>Two-Axle</u>	<u>Four-Axle</u>	<u>Two-Axle</u>	<u>Four-Axle</u>	<u>Two-Axle</u>	
Lock repairmen	2.0	2.0	2.0	2.0	6.0	8.0	↑
Carpenters repairing body and inside equipment	27.0	27.0	22.0	26.5	16.0	22.0	24.0
Riveters	4.5	7.0	5.0	7.0	6.0	4.0	--
Straighteners	6.5	6.0	2.0	2.5	--	1.5	--
Steam and water pipe fitters	3.0	3.0	2.0	2.0	4.0	2.0	--
Tinsmiths	2.0	2.0	2.0	2.0	2.0	2.0	--
Roof fitters	4.5	6.0	4.5	4.5	8.0	6.0	6.0
Welders	2.0	1.0	2.5	1.5	2.0	2.0	2.0
Painters	22.0	23.0	23.0	21.0	10.0	10.0	9.0
Blacksmiths, forgers	1.0	--	1.0	1.5	1.0	1.0	
Machine operators	1.0	1.0	1.0	1.0	1.0	1.0	
Bearing reliners	.2	.2	.2	.2	.2	.2	9.0
Spring riggers	.8	1.8	.8	.8	.8	1.8	
Wheelwrights	1.0	1.0	1.5	1.5	1.0	1.0	
Other workers	10.5	10.0	18.0	16.0	8.0	10.0	10.0

The following table gives the approximate man-hours of manual and machine work involved per car in the automatic brake shop of a railroad car repair yard:

<u>Type of Repairs</u>	<u>Man-Hours per Car</u>			
	<u>Freight</u>		<u>Passenger</u>	
	<u>Four-Axle</u>	<u>Two-Axle</u>	<u>Four-Axle</u>	<u>Two-Axle</u>
Capital	10	7	26	22
Medium	10	7	22	22
Annual	3	2	7	5
Current, car uncoupled	1	0.7	2	0.9

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The following table gives the man-hours per car in making repairs on a passenger car in the upholstery shop of a passenger car repair yard:

	<u>Capital Repairs</u>		<u>Medium Repairs</u>		<u>Annual Repairs</u>	
	<u>Four-Axle</u>	<u>Two-Axle</u>	<u>Four-Axle</u>	<u>Two-Axle</u>	<u>Four-Axle</u>	<u>Two-Axle</u>
Soft-seat car	200	140	120	80	25	--
Hard-seat car	22	12	9	6	3	2

Of the total welding done at a railroad car repair yard, 75-80 percent is done by electricity and 20-25 percent by gas. Thin-coated electrodes are used mainly at a car repair yard. In welding car parts, electrodes of 4-6 millimeters in diameter are used. Gas welding is used mainly in welding cast-iron parts.

The following table gives in kilograms the amount of electrodes used per car when making repairs in a car yard:

<u>Type of Repairs</u>	<u>Freight Cars</u>		<u>Passenger Cars</u>	
	<u>Four-Axle</u>	<u>Two-Axle</u>	<u>Four-Axle</u>	<u>Two-Axle</u>
Capital	14-18 kg	8-9 kg	60 kg	20 kg
Medium	6-10 kg	4-6 kg	50 kg	18 kg
Annual	2-4 kg	1.5-4 kg	16 kg	10 kg
Current	0.35 kg per 10,000 car-axle-km		0.20 kg per 10,000 car-axle-km.	

Until 1929, Soviet railroads used stannous or antiminous babbitt for pouring antifriction bearings, but the high cost of stannous and the poor qualities of antiminous babbitt made it necessary to use some other alloy and, as a result, calcium babbitt was accepted as standard for use in rolling stock, particularly in car bearings. The composition of calcium babbitt is .75-1.1 percent calcium, .65-.95 percent sodium, and the remainder lead. The amount of calcium babbitt necessary to pour a 6-millimeter bearing is 1.98 kilograms for a type I axle, 2.39 kilograms for a type II axle, 3.64 kilograms for a type III axle, and 4.16 kilograms for a SVPS axle.

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